4. MINERAL RESOURCE DEVELOPMENT POTENTIAL

SECTION 4
MINERAL RESOURCE DEVELOPMENT POTENTIAL

4.1 MINERAL POTENTIAL

The long history of mineral production and development within the planning area documents the widespread abundance of minerals that were created by various geological processes throughout the region. Historical gold production is tied closely to the initial formation of the Idaho Territory in 1864 and statehood in 1890. The state has had continuous mineral development for over 140 years, beginning with the early production of gold by individual prospectors and miners, through development of the large-scale underground silver, lead, and zinc mines of the Coeur d'Alene Mining District, to the modern era of large tonnage low-grade gold mines. It also includes the development of various industrial minerals, such as sand and gravel, crushed aggregate, dimension stone, garnet, limestone, and clay. More recently, mineral activity takes the form of individual recreational miners looking for gold placers, garnets, gemstones, petrified wood, agate, or fossils on federal and state lands.

Previous assessments of the mineral potential of Idaho have been completed by the US Geological Survey (1995) and the US Bureau of Mines (1988) and were useful in evaluating the current assessment of the planning area. These assessments were not site-specific, nor did they include the industrial minerals resource that is an important part of the planning area.

In the US Geological Survey report entitled "Assessment of Undiscovered Mineral Resources in the Pacific Northwest: A Contribution to the Interior Columbia Basin Ecosystem Management Project" (US Geological Survey 1995), a rigorous review and classification of various mineral deposits models was completed. The report outlined areas where permissive geology is present and identified potential mineral deposit types within those areas.

The US Bureau of Mines report entitled "Availability of Federally Owned Minerals for Exploration and Development in Western States: Idaho" (US Bureau of Mines 1988) identified and evaluated known mineral deposit areas (KMDA) and compared them to the availability on federal lands.

The evaluation of the mineral resource potential within the planning area analyzes information from the US Geological Survey (1995) report and the US Bureau of Mines (1988) report combined with updated recent and historical information. Conclusions are based primarily on the historic occurrences of mines and prospects, levels and value of mineral production, recent exploration activity, and presence or absence of favorable geology and operative geological processes.

A review of the recent (1992-2002) mineral production in Idaho included in **Table 4-1** is based on data compiled by the Idaho Geological Survey in the annual reports entitled "The Mineral Industry of Idaho" (US Geological Survey 2004). The annual reports show trends of various mineral commodities in order to provide a perspective of future potential activity. Gold and silver production has been reduced substantially from the mid-1990s through 2002 due to extremely low prices, exhaustion of ore reserves, closure of major mines, and loss of infrastructure. On the other hand, sand and gravel for construction and industrial use has increased moderately from 1992 to the present time. The crushed stone industry, including limestone and other materials, has more than doubled in output from 1992 to 2002. Idaho is the largest producer of abrasive garnets in the United States over the past several decades, with production from the Emerald Creek mines as the primary source. Where figures are available for dimension stone, it has shown dramatic increases from 1998 to 1999 and has probably continued to increase through 2003.

The recent mine operations and exploration activity in Idaho from 1994 to 2003 is shown in **Table 4-2;** these data also were derived from the "The Mineral Industry of Idaho" annual reports (US Geological Survey 2004). These reports show the decrease in the major silver-lead-zinc mines of the Coeur d'Alene Mining District from four mines to two mines over the past decade. In 1994 there were five large open pit/heap leach gold mines in production, whereas there are no major gold mines operating in the state today . A recent positive trend in the gold industry shows an increase of exploration projects from zero in 1999 to fourteen in 2003. This increase is due primarily to the dramatic increase in the price of gold over the past two years, which has stimulated gold exploration and may lead to future development.

Table 4-1
Nonfuel Raw Mineral Production in Idaho (1992-2002)
(value in thousands of dollars)

		1992		1993		1994		1995		1996	
		Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Mineral											
Antimony	metric tons	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	242	w
Clays (common)		n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	1	$10	n. a.	n. a.
Garnet		n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.
Gemstones		n. a.	$390	n. a.	$566	n. a.	$287	n. a.	$346	w	w
Gold	kilograms	4,037	$44,744	w	w	5,600	w	8,850	$110,000	10,800	$135,000
Molybdenum	metric tons	w	w	n. a.	n. a.	5,500	w	w	w	w	w
Phosphate Rock	mt. x,000	5,208	$84,000	4,355	$78,432	w	w	w	w	w	w
Pumice/pumicite	metric tons	55,525	$401	43,438	$327	w	w	w	w	159,000	$1,340
Sand and gravel											
Construction	mt. x,000	13,522	$40,728	13,600	$44,900	14,500	$46,300	13,200	$43,500	14,700	$46,100
Industrial	mt. x,000	728	$9,214	w	w	w	w	501	$8,720	646	$8,510
Silver	metric tons	254	$32,131	190	$26,232	162	w	182	$30,200	229	$38,300
Stone-crushed	mt. x,000	3,269	$19,200	4,602	$20,770	4,160	$20,300	3,210	$14,000	3,960	$20,200
dimension stone		n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.
Combined value, others		n. a.	$78,980	n. a.	$102,938	n. a.	$279,000	n. a.	$303,000	n. a.	$242,000
	Total	**n. a.**	**$309,788**	**n. a.**	**$274,165**	**n. a.**	**$345,887**	**n. a.**	**$509,776**	**n. a.**	**$491,450**
Crushed Stone Included in Totals											
Limestone	mt.x,000	704	$3,120	316	$1,426	407	$1,400	869	$3,370	1,370	$7,920
Granite	mt.x,000	359	$1,865	382	$1,834	281	$1,100	611	$3,370	549	$3,060
Traprock	mt.x,000	1,013	$4,161	2,845	$10,866	2,230	$9,440	1,400	$5,720	1,680	$6,150
Quartzite	mt.x,000	w	w	564	$4,670	556	$1,800	328	$1,500	371	$3,110
Shell	mt.x,000	48	$200	w	w	w	w	8	$42	n. a.	n. a.
Miscellaneous stone	mt.x,000	w	w	418	$1,590	642	$3,370	n. a.	n. a.	2	$2
	Total	**2,124**	**$9,346**	**4,525**	**$20,386**	**4,116**	**$17,110**	**3,216**	**$14,002**	**3,972**	**$20,242**

Notes:
n. a.—not available; w—withheld to avoid disclosure
Source: US Geological Survey 2004

Table 4-1 *(continued)*
Nonfuel Raw Mineral Production in Idaho 1992-2002
(value in thousands of dollars)

		1997		1998		1999		2000		2001		2002	
Mineral		**Quantity**	**Value**	**Quantity**	**Value**	**Quantity**	**Value**	**Quantity**	**Value**	**Quantity**	**Value**	**Quantity**	**Value**
		356											
Antimony	metric tons	n. a.	w	242	w	449	w	w	w	n. a.	n. a.	n. a.	n. a.
Clays (common)		n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.
Garnet		w	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.
Gemstones		7,490	$687	w	$321	w	$368	w	$411	w	$656	w	$460
Gold	kilograms	w	$80,100	w	w	w	w	w	w	w	w	w	w
Molybdenum	metric tons	w	w	w	w	w	w	w	w	w	w	w	w
Phosphate Rock	mt. x,000	83,100	w	w	w	w	w	w	w	w	w	w	w
Pumice/pumicite	metric tons		$758	73,400	$686	98,600	$917	w	w	w	w	w	w
Sand and gravel		14,800											
Construction	mt. x,000	630	$42,700	16,600	$52,400	15,500	$48,200	17,500	$55,700	15,000	$52,400	15,700	$57,700
Industrial	mt. x,000	341	$7,950	710	$8,470	711	$11,200	w	w	w	w	w	w
Silver	metric tons	3,910	$53,800	447	$73,200	416	$70,100	416	$66,900	w	w	w	w
Stone-crushed	mt. x,000	n. a.	$18,700	4,180	$18,400	4,220	$19,000	3,500	$14,800	5,250	$22,500	3,420	$15,800
dimension stone		n. a.	n. a.	15,900	$4,710	39,300	$5,510	w	w	w	w	w	w
Combined value others		$264,000	**n. a.**	n. a.	$281,000	n. a.	$250,000	n. a.	$219,000	n. a.	$213,000	n. a.	$197,000
	Total		**$468,695**	**n. a.**	**$439,187**	**n. a.**	**$405,295**	**n. a.**	**$356,811**	**n. a.**	**$288,556**	**n. a.**	**$270,960**
Crushed Stone included in totals			1,150										
Limestone	mt.x,000	140	$5,860	1,040	$4,030	1,020	$4,130	607	$1,920	564	$3,240	460	$2,890
Granite	mt.x,000	1,460	$243	256	$911	343	$1,280	240	$975	235	$1,090	160	$793
Traprock	mt.x,000	w	$6,420	1,900	$8,960	1,830	$7,620	1,990	$8,960	3,710	$14,700	2,140	$9,140
Quartzite	mt.x,000	n. a.	w	466	$2,050	574	$4,090	495	$2,020	371	$1,580	356	$1,520
Shell	mt.x,000	1,160	n. a.	23	$77	12	$87	17	$107	19	$134	24	$167
Miscellaneous stone	mt.x,000	**3,910**	$6,190	497	$2,320	320	$1,290	156	$774	355	$1,680	279	$1,280
	Total		**$18,713**	**4,182**	**$18,348**	**4,099**	**$18,497**	**3,505**	**$14,756**	**5,254**	**$22,424**	**3,419**	**$15,790**

Notes:
n. a.—not available; w—withheld to avoid disclosure; mt.x – millions of metric tones
Source: US Geological Survey 2004

Table 4-2
Recent Mines and Exploration in Idaho 1994-2003

			1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
MINING PROPERTIES												
Commodity/Mine Name	County	Significant Mining Events										
SILVER/LEAD/ZINC												
Lucky Friday Mine	Shoshone	Continues production, expands in 2005	*	*	*	*	*	*	*	*	*	*
Sunshine Mine	Shoshone	Closed mine in 2001, low prices, smelter closed	*	*	*	*	*	*	0	0	0	0
Galena Mine	Shoshone	Continues production, expands in future	*	0	0	*	*	*	*	*	*	*
Coeur Mine	Shoshone	Closed mine in 2001, low prices, smelter closed	*	0	*	*	0	0	0	0	0	0
Total Mines Active			4	2	3	4	3	3	2	2	2	2
Total Exploration Projects			1	2	2	2	3	2	2	2	2	3
GOLD												
Beartrack Mine	Lemhi	Operated 1994-2000, closed in 2000	*	*	*	*	*	*	0	0	0	0
Grouse Creek Mine	Custer	Operated 1994-1995, closed in 1996	*	0	0	0	0	0	0	0	0	0
Black Pine Mine	Cassia	Operated 1991-1998, closed in 1998	*	*	*	0	0	0	0	0	0	0
De Lamar Mine	Owyhee	Operated 1980-1998, closed in 1998	*	*	*	*	0	0	0	0	0	0
Stibnite	Valley	Operated 1991-1998, closed in 1998	*	*	*	*	0	0	0	0	0	0
Yellowjacket Mine	Lemhi	Minor operation 1991-1999	*	*	*	0	0	0	0	0	0	0
Rescue Mine	Idaho	Minor operation 1991-1999	*	*	*	0	0	0	0	0	0	0
Total Mines Active			7	6	6	3	1	1	0	0	0	0
Total Exploration Projects			4	4	8	10	1	0	1	2	11	14
MOLYBDENUM												
Thompson Creek Mine	Custer	Operated 1993-2003, expanded operations in 2003	*	*	*	*	*	*	*	*	*	*
COBALT,GOLD,COPPER												
Blackbird Mine	Lemhi	Exploration 1994-2003	*	*	*	*	*	*	*	*	*	*
GARNET												
Emerald Creek Mining Co.	Latah, Benewah	#1 garnet producer in US, expanded in 2003	*	*	*	*	*	*	*	*	*	*
CLAY												
Helmer-Bosvill Property	Latah	Exploration 2000-2003	0	0	0	0	0	0	*	*	0	*
DECORATIVE STONE												
Mines in Idaho	Boise, Custer	Mines for decorative stone increased in 2001	1	1	1	1	1	1	2	2	5	5

Active mines *; Inactive or closed mines-0
Source: US Geological Survey 2004

The garnet mining industry is slated for expansion in 2005 at the Emerald Creek Mining Company property in Shoshone and Latah counties. Decorative stone mines in Idaho increased from one in 1994 to five in 2003, although information on small producers is unavailable.

This compilation of data provides information regarding the level of activity statewide, which is also expected to be reflected in the future activity within the planning area.

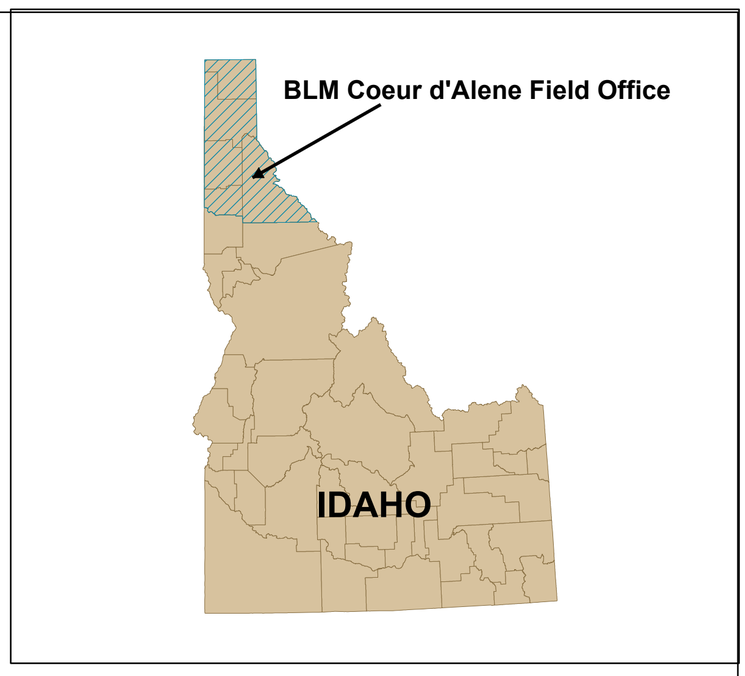
A map outline of the mineral potential areas in the planning area is presented in **Figure 4-1** (Mineral Potential of the BLM Coeur d'Alene Field Office). The outline is based on the presence of mineral occurrences, prospects and mines, favorable geological terrains, mineral deposit model types that may be present within those terrains, and current mineral exploration/development activity. The 1988 US Bureau of Mines report was referred to for data. The presence of significant BLM land blocks either as managed lands or as acquired lands was also taken into account in defining these areas.

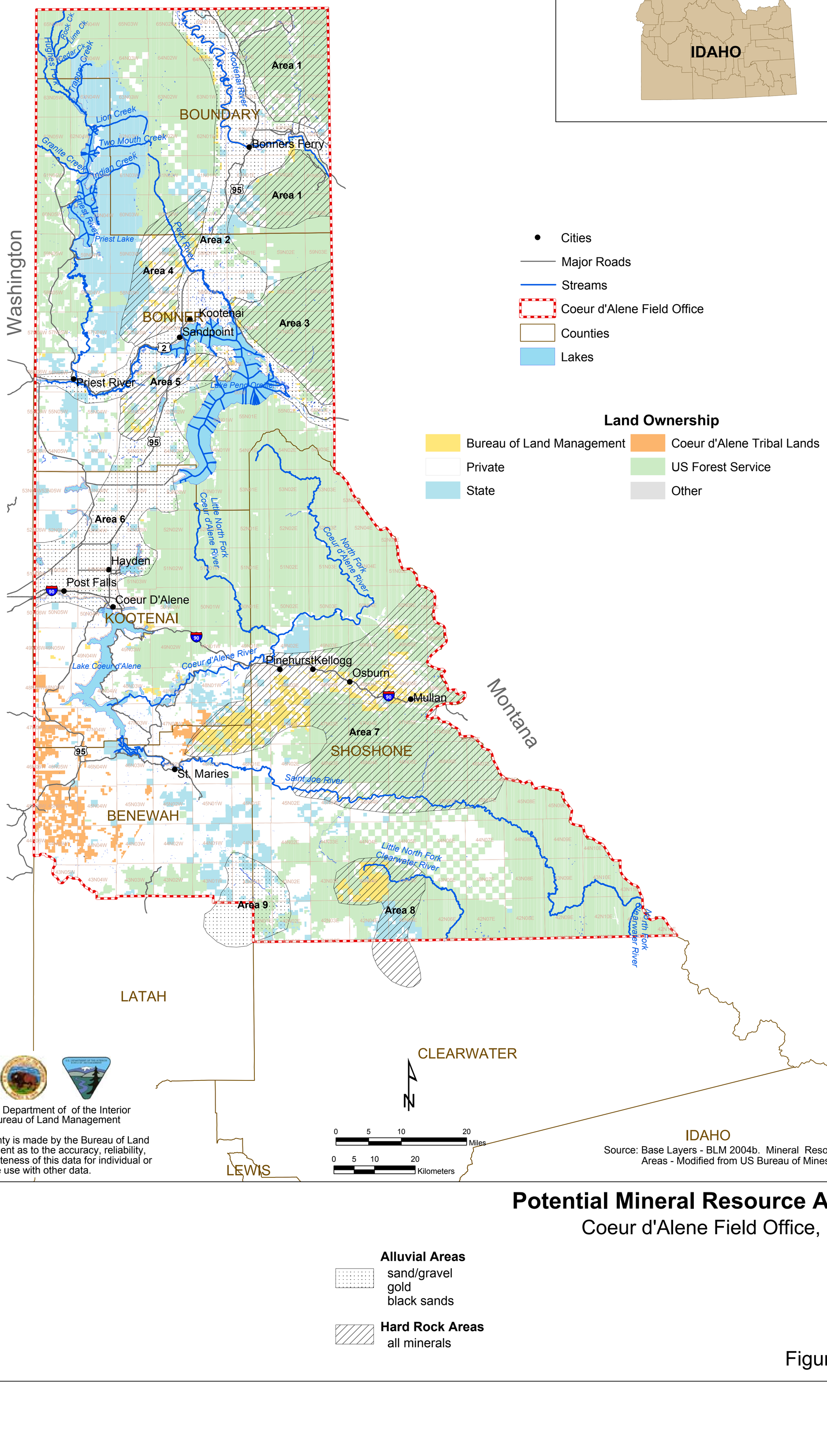
The nine areas outlined on **Figure 4-1** include those areas where there are a significant number of metal or industrial material mines and prospects. These nine areas are tied directly to **Table 4-3,** which lists the mineral potential for a number of commodities found in each area. This mineral potential assessment includes the assignment of level of potential and level of certainty, as defined in BLM Manual #3031 (Mineral Potential Classification System). Each area can have more than one commodity with different levels of potential and certainty. For example, in Area 7 (Coeur d'Alene Mining District) the mineral potential for silver-lead-zinc is **H-D** (high-direct evidence), whereas the potential for uranium is **L-B** (low-indirect evidence).

Reference to **Figure 4-1** combined with assessment in **Table 4-3** provides detailed information that can be used to determine mineral potential of BLM land within the nine areas.

All the other nondesignated areas that fall outside the defined areas are considered to have low or no potential for mineral resources, based on a lack of mines, prospects, or occurrences and unfavorable geological conditions. These areas may contain small isolated blocks of BLM land that have no mineral potential.

Table 4-4 provides an assessment of the overall commodity potential throughout the Coeur d'Alene Field Office planning area. This includes all commodities that were evaluated within each of the main BLM mineral resource categories (i.e., leasable, acquired lands leases, locatable, and salable). Some commodities, such as salt or phosphate, may not occur within the planning area, but they have been examined and evaluated based on whether the geological environment may or may not be present in the region.





U.S. Department of of the Interior
Bureau of Land Management

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of this data for individual or aggregate use with other data.

Decmber 2004

Source: Base Layers - BLM 2004b. Mineral Resource Areas - Modified from US Bureau of Mines 1988.

Potential Mineral Resource Areas

Coeur d'Alene Field Office, Idaho

Alluvial Areas
sand/gravel
gold
black sands

Hard Rock Areas
all minerals

Figure 4-1

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Table 4-3
Mineral Potential in the Coeur d'Alene Field Office Area

Area	Commodity	Mineral Potential		Remarks
		Potential	Certainty	
1	AU	L	B	Few small prospects in the area
	AG	L	C	Minor producers in the area
	CU	L	B	Few small prospects in the area
	CO/NI	L	B	Purcell Sills have few small prospects
	PB/ZN	L	C	Minor producers in the area
	MO	L	B	Few small prospects in the area
	TH	L	B	Few small prospects in the area
	W	L	B	Few small prospects in the area
	SILICA	L	B	Belt Series quartzites unknown
2	SAND-GRAVEL	H	C	Producer in alluvial fill of Purcell Valley
	PEAT	L	B	Minor producers in Purcell Valley
3	AU	L	B	Few small prospects in the area
	AG	L	C	Minor producers in the area
	CU	L	B	Few small prospects in the area
	PB/ZN	L	C	Minor producers in the area
	MO	L	B	Few small prospects in the area
	W	L	B	Few small prospects in the area
	SILICA	L	B	Few small prospects in the area
4	AU	L	B	Few small prospects in the area
	AG	L	B	Few small prospects in the area
	CU	L	B	Few small prospects in the area
	PB/ZN	L	B	Few small prospects in the area
	MO	L	B	Few small prospects in the area
	BE	L	B	Few small prospects in the area
	SILICA	L	B	Few small prospects in the area
5	AU	L	B	Few small prospects in the area
	AG	L	B	Few small prospects in the area
	CU	L	B	Few small prospects in the area
	PB/ZN	L	B	Few small prospects in the area
	MO	L	B	Few small prospects in the area
	BE	L	B	Few small prospects in the area
	SILICA	L	B	Few small prospects in the area
6	SAND-GRAVEL	H	D	Major producers in alluvial fill
	PEAT	L	B	Minor producers in Rathdrum Prairie
7	AU	H	D	Production in Murray Mining District
	AG	H	D	Production in Coeur d'Alene Mining District
	CU	H	D	Production in Coeur d'Alene Mining District
	PB/ZN	H	D	Production in Coeur d'Alene Mining District
	SB	H	D	Production in Coeur d'Alene Mining District
	W	L	B	Few small prospects in area

Table 4-3 *(continued)*
Mineral Potential in the Coeur d'Alene Field Office Area

Area	Commodity	Mineral Potential		Remarks
		Potential	Certainty	
	U	L	B	Minor occurrence in Coeur d'Alene District
	SILICA	L	B	Belt Series Quartzites potential unknown
	SAND-GRAVEL	H	D	Major producers in alluvial fill
8	KYANITE	L	B	Few small prospects the area
	GEMSTONES	L	B	Few small prospects the area
9	GARNET	H	D	Production in Emerald Creek District
	CLAY	L	A	Production at nearby Bovill clay mines

Area refers to locations on Figure 4-1.
Mineral potential based on BLM Mineral Potential Classification System, BLM Manual #3031

Table 4-4
Summary of Commodity Potential of the Coeur d'Alene Field Office Area

Type	Commodity	Mineral Potential		District	Remarks
		Potential	Certainty		
LEASABLE					
	Coal	L	B	none	No identified coal resources
	Peat	L	B	none	Minor producers, Kootenai Valley-Rathdrum Prairie
	Geothermal	L	C	none	No identified KGRA or geothermal resources
	Oil/Gas	L	B	none	No BLM leases or activity
	Phosphate	0	D	none	No identified occurrences
	Sodium	0	D	none	No identified occurrences
	Sulfur	0	D	none	No identified occurrences
	Asphalt	0	D	none	No identified occurrences
ACQUIRED LANDS					
	Garnet	H	D	Emerald Creek	Major producer at Emerald Creek District
	Clay	L	B	Bovill-Latah County	Historic production at Bovill District
LOCATABLE					
	Gold	H	C	Murray	Major historic gold production
	Other Au dist.	L	B	Other gold districts	Minor production and prospects
	Silver/lead/zinc	H	D	Coeur d'Alene District	Major historic silver/lead/zinc production
	Other silver/lead/zinc dist.	L	B	Other minor districts	Minor production and prospects
	Beryllium	L	B	none	Minor prospects
	Cobalt/Nickel	L	B	Purcell Sills region.	Minor prospects in Purcell Sills area

Table 4-4 *(continued)*
Summary of Commodity Potential of the Coeur d'Alene Field Office Area

Type	Commodity	Mineral Potential		District	Remarks
		Potential	Certainty		
	Manganese	L	B	none	No identified occurrences
	Niobium/Tantalum	L	B	none	Minor occurrences in black-sands along rivers
	Thorium/Rare Earths	L	B	none	Minor occurrences in black-sands along rivers
	Titanium/Zirconium	L	B	none	Minor occurrences in black-sands along rivers
	Antimony	L	B	Coeur d'Alene district	Minor production Coeur d'Alene District
	Barite	L	B	none	No identified occurrences
	Fluorspar	L	B	none	No identified occurrences
	Other Garnet	L	B	none	Minor occurrences in black-sands along rivers
	Gemstones	L	B	none	Minor prospects along Clearwater River
	Gypsum/Anhydrite	L	B	none	No identified resources
	Mercury	L	B	none	No identified resources
	Mica/Feldspar	L	B	Avon Dist.-Latah County.	Producer in Avon District in nearby Latah County
	Molybdenum	L	A	none	Minor prospects in area, favorable geology
	Phosphate	0	D	none	No identified resources
	Kyanite/Refractories	L	B	Goat Mountain, Shoshone County	Minor prospects at Goat Mountain, Shoshone County
	Salt	0	D	none	No identified resources
	Tungsten	L	B	none	No identified resources
	Uranium	L	B	none	No identified resources
	Vanadium	L	B	none	No identified resources
	Copper/Iron	L	B	none	No identified resources
SALABLE					
	Sand/gravel/aggregate	H	D	Pend Oreille, OreilleRathdrum Prairie	Producers in Purcell trench, Rathdrum Prairie
	Pumice/pumicite	L	B	none	No identified resources
	Silica/quartzite	L	B	none	No identified resources, favorable geology Belt Series
	Limestone	L	B	none	No identified resources
	Clay	L	A	Bovill District, in nearby Latah County	No identified resources, favorable geology
	Dimension Stone	H	C	Rathdrum Prairie	Producers in area, favorable geology

Mineral potential based on BLM Mineral Potential Classification System, Manual #3031

This assessment provides a comprehensive evaluation for all minerals that have a reasonable possibility of occurring within the planning area. Any minerals that are not specifically mentioned and evaluated are considered to

have no potential to occur based on a lack of identification anywhere within the planning area.

The Mineral Potential Classification System as defined in BLM Manual #3031 is outlined below.

BLM MANUAL #3031

Mineral Potential Classification System

LEVEL OF POTENTIAL

O. The geologic environment, the inferred geologic processes, and the lack of mineral occurrences do not indicate potential for accumulation of mineral resources.

L. The geologic environment and the inferred geologic processes indicate low potential for accumulation of mineral resources.

M. The geologic environment, the inferred geologic processes, and the reported mineral occurrences or valid geochemical/geophysical anomaly indicate moderate potential for accumulation of mineral resources.

H. The geologic environment, the inferred geologic processes, the reported mineral occurrences and or valid geochemical/geophysical anomaly, and the known mines or deposits indicate high potential for accumulation of mineral resources. The "known mines and deposits" do not have to be within the area that is being classified, but have to be within the same type of geologic environment.

ND. Minerals potential not determined due to lack of useful data. This does not require a level of certainty qualifier.

LEVEL OF CERTAINTY

A. The available data are insufficient and/or cannot be considered as direct or indirect evidence to support or refute the possible existence of mineral resources within the respective area.

B. The available data provide indirect evidence to support or refute the possible existence of mineral resources.

C. The available data provide direct but quantitatively minimal evidence to support or refute the possible existence of mineral resources.

D. The available data provide abundant direct and indirect evidence to support or refute the possible existence of mineral resources.

For determination of No Potential use O/D. This class shall be seldom used, and when used it should be for a specific commodity only.

As used in this report, potential refers to "… potential for the presence (occurrence) of a concentration of one or more energy and/or mineral resources. It does not refer to or imply potential for development and/or extraction of the mineral resource(s). It does not imply that the potential concentration is or may be economic, that is, could be extracted profitably."

4.2 LEASABLE MINERALS POTENTIAL

The Mineral Potential Classification Rating of leasable minerals for a variety of commodities is summarized in **Table 4-4**. All of the leased mineral lands, including fluid and non-fluid varieties, have a low potential for discovery or development due to geological conditions that are not favorable to the formation of these minerals.

4.2.1 Coal/Peat

There are no identifiable coal resources within the planning area. No commercial production is recorded, and there is only one small poor quality coal prospect near Orofino that was used as a local resource in the past. Minimal exploration information is available on the coal occurrence within the area.

Irregular lenticular beds of low-quality lignite-grade coal have been identified in northeast Oregon intra-layered within the Columbia River Basalt flows. These have been investigated by a number of coal mining companies over the past decade. None of these coal layers are considered to be commercial due to a lack of continuity, low reserves, thick basalt overburden, and low quality material.

There are no identifiable peat resources within the planning area. Minor production of peat has occurred within the Kootenai River Valley of Boundary County, but little information is available on the quantity or quality of the material. It is reported to occur within swamps and bogs along the Kootenai River drainage.

The Mineral Potential Classification Rating **(Table 4-4)** for coal throughout the Coeur d'Alene field office area is **L-B** because of an unfavorable geological environment and a lack of occurrences.

The mineral potential rating (**Table 4-4)** for peat within the Coeur d'Alene Field Office area is **L-B** based on a lack of occurrences with a minimum of information.

4.2.2 Geothermal

There are only two warm water occurrences within the planning area, including a warm well north of Spirit Lake in Kootenai County and a warm spring north of Wallace in Shoshone County. Neither of these occurrences is classified as a Known Geothermal Resource Area by the Idaho Department of Water Resources, which is responsible for geothermal evaluation in the state (Idaho Department of Water Resources 2002).

Elsewhere in the southwestern and southeastern parts of the state, significant geothermal resources are present, particularly in and near the Snake River plain. This area is underlain by younger Tertiary age volcanics related to a high temperature hotspot, which has created many of the hot springs in southern Idaho. There is no similar geological environment within the planning area.

The potential for developing geothermal resources is considered to be low. The surface water temperatures are not high enough to rank as a geothermal resource. No information base is available concerning subsurface temperatures of the hot springs due to a lack of drilling and a low priority rating by the state.

The Mineral Potential Classification Rating **(Table 4-4)** for geothermal resources in the Coeur d'Alene Field Office planning area is **L-C** because of a lack of Known Geothermal Resource Areas, although a preliminary assessment and measurement of warm springs and wells has been completed by the Idaho Department of Water Resources.

4.2.3 Oil and Gas

Oil and gas exploration has been minimal within the planning area. During the higher oil/gas prices of the 1980s, extensive oil and gas leasing occurred throughout the region, but no follow-up seismic surveys were conducted. This leasing was probably of a speculative nature by either individuals or by oil companies to cover any potential exploration play elsewhere in the region.

There are only two exploratory oil/gas wells within the planning area; these were located in the Rathdrum Prairie north of Coeur d'Alene in Kootenai County. The wells drilled in the years 1928-29 were shallow (<2000 feet) and apparently did not encounter any hydrocarbons. Very little information is available regarding the exploration target or the results of the drilling. Geological conditions are not favorable for development of favorable exploration targets due to the lack of favorable reservoir rocks, high temperature metamorphic terrain surrounding the Idaho Batholith, presence of younger Columbia River Basalts masking sub-surface geophysical surveys, and presence of non-prospective Precambrian Belt Series rocks.

The Mineral Potential Classification Rating for oil/gas **(Table 4-4)** in the Coeur d'Alene Field Office planning area is **L-B** due to the unfavorable geological terrain and unsuccessful results of prior drilling.

4.2.4 Other Leasable Minerals

Other minerals included in the leasable category by the Mineral Leasing Act of 1920, as amended, are phosphate, sodium, sulphur, and asphalt. No significant occurrence of any of these leasable minerals has been identified within the planning area.

The geological conditions for the development of these other leasable minerals are not present within the planning area. Each of these minerals requires very specific geological environments in order to develop, such as the euxenic black shales of the Phosphoria Formation in southeast Idaho for phosphate or saline evaporates for sodium, none of which occur in northern Idaho. Conditions for the formation of sulphur and asphalt within the geologic terrains of the region are negligible.

The Mineral Potential Classification Rating for phosphate, sodium, sulphur, and asphalt **(Table 4-4)** in the Coeur d'Alene Field Office planning area is **O-D.** The unfavorable geological environment, inferred geological processes, and lack of mineral occurrences indicate no potential for accumulation of mineral resources in this category.

4.2.5 Acquired Minerals Leases

Significant development of the garnet resources has occurred on acquired mineral leases within the Emerald Creek District and Latah, Benewah, and Shoshone counties. Mining within this area has been continuous for over 50 years, with Idaho ranking as the number one abrasive garnet producer in the nation for nearly that entire period of time.

The BLM has issued three acquired land leases for garnet covering 1,620 acres in the planning area, and historically there were 27 BLM leases involving 2,595.63 acres that are inactive–case closed. The mineral development activity level is very high for Emerald Creek and the adjacent drainage.

The Mineral Potential Classification Rating **(Table 4-4)** for garnets in the acquired lease lands of the Coeur d'Alene Field Office planning area is **H-D** based on the high prior production levels and continued development by operating companies in the area.

Clay deposits are developed just to the south of the Emerald Creek area in northeastern Latah County. The clay forms as pervasive deep weathering profile developed in the underling granite. Information is sketchy regarding

the development of a deep clay weathering profile in the Emerald Creek area, but geological conditions could be favorable for this type of deposit.

The Mineral Potential Classification Rating **(Table 4-4)** for clay deposits in the Coeur d'Alene Field Office area is **L-B** due to the limited number of occurrences, although the geological terrain is considered to be favorable.

4.3 LOCATABLE MINERALS

A wide variety of locatable minerals are developed within the planning area due to the number of diverse geological environments that are considered to be favorable for development of different commodities. The Mineral Potential Classification ratings for locatable minerals is provided in **Table 4-4**. The principal locatable mineral commodities for the planning area are silver-lead-zinc in the Coeur d'Alene Mining District, gold in the Murray Mining District, garnets in the Emerald Creek District, and sand/gravel and crushed stone in the Rathdrum Prairie District.

4.3.1 Silver, Lead, and Zinc

Mineral potential for silver/lead/zinc is considered high within the Coeur d'Alene Mining District based on the past production as one of the most significant mining districts in the world. This is supported by the continued discovery of new ore reserves at deeper levels by the two current operating mining companies in the district. Other companies have expressed an interest to re-enter the district in order to evaluate development of the older mines or explore for additional resources at the prospects. Silver production at the two operating mines exceeds 6 million ounces per year, with substantial amounts of lead and zinc concentrates. The BLM has 64 partial sections of land throughout the Coeur d'Alene Mining District that could be involved in any rejuvenation of mining development in the district.

There is high potential for discovery and development of additional silver, lead, and zinc deposits within the Coeur d'Alene Mining District based on past production and current success in exploration projects. The district has been studied extensively by both private mining companies and government agencies in order to provide information on the factors controlling the location and development of the ore bodies. Non-geologic factors that enter into the decision to mine include high and stable prices for commodities, and political/environmental conditions that affect mineral resource development.

The Mineral Potential Classification Rating for silver, lead, zinc **(Table 4-4)** in the Coeur d'Alene Mining District is **H-D** based on the extremely high levels of prior production, current mining activity, and recent exploration successes at the producing mines.

Elsewhere in the region there are numerous historical small mines and prospects that have had minor to moderate production in the past, although

currently none of these mines are in operation. Many of the mines are similar to the Coeur d'Alene District in terms of mineralogy, Belt Series host rock, major faulting, and overall geologic conditions. Only the size or extent and grade of smaller mineral deposits in the outlying districts are different. Mineral exploration has been focused in some of these smaller districts in the past and will probably continue in the future, depending on metal prices and other factors. Some of these minor producers include the Porthill, Clark Fork, Pend Oreille, Bayview, and Lakeview Mining Districts. There is no BLM land adjacent to any of these historical districts.

Extensive mineral exploration has been conducted by Cominco-American Mining Company and others for Sullivan-type strata-bound lead, zinc, silver, and copper ore bodies in argillaceous rocks of the Pritchard Formation of the Lower Belt Series. This exploration is concentrated on recognizing favorable geological conditions in rocks that occur at depths with minimal surface indications. Therefore, mineral exploration and mine development can occur anywhere within the region where the favorable lower Belt Series rocks are present. This exploration has not been successful to date but will undoubtedly continue in the future as the geological terrain is favorable and the presence of the nearby smelter in Trail, British Columbia provides an attractive location for processing any new mine development.

The Mineral Potential Classification Rating for silver, lead, zinc **(Table 4-4)** in these smaller mining districts is **L-B** due to the prior minor production levels and extensive unsuccessful exploration conducted within the past two decades.

4.3.2 Gold

There are a number of minor gold producers and prospects throughout the planning area that have received historical exploration and development over the past century.

The principal gold potential within the planning area is in the Murray Mining District, where about 439,000 ounces of gold has been recovered primarily from placer deposits along Prichard Creek and minor lode gold at the Golden Chest Mine and other smaller adjacent producers. This district has been the focus of mineral exploration over the past twenty years. Recent interest is centered on the Golden Chest Mine by the New Jersey Mining Company, which plans to conduct mineral exploration at the mine. The BLM holds substantial land in the Murray Mining District surrounding several blocks of patented land, particularly near the Golden Chest Mine. This district will continue to attract exploration attention in the future due to the historical production and favorable geological terrain.

The Mineral Potential Classification Rating **(Table 4-4)** for gold in the Murray Mining District is **H-C** due to the prior high production level, current exploration interest, and geologically favorable environment.

Gold was a by-product of lead, silver, and copper veins from small mines in the Moyie-Yaak District in Shoshone County and the St. Joe District in Benewah County. Favorable geological terrains for gold occurrences are present throughout the planning area. These include granitic intrusions, such as the extensive Idaho Batholith, and outlying associated bodies, younger Tertiary age plutons, extensive shear zones cutting the highly fractured Belt Series rocks, reactive carbonate sequences within the Belt Series, volcanogenic massive sulfides with a copper-gold association in the Wallowa-Seven Devils Terrain, segregations in the mafic Purcell Sills, and placer gold concentrations in alluvium. There are no lack of potential gold-bearing geological environments and conditions within the region. Mineral exploration is expected to fluctuate from time to time throughout the planning area depending on gold price and other factors that affect mineral resource development.

The Mineral Potential Classification Rating **(Table 4-4)** for gold in these smaller districts and other geological terrains is **L-B** based on the limited gold production from most of the prospects. However, the geological terrain is considered to be favorable for exploration targets of more significant size.

4.3.3 Strategic Minerals

Strategic minerals have been identified in the planning area, but there has been no significant production of any of these minerals. Most of these occur in small lode prospects or have been recognized in black-sand placer deposits that may be mined for other minerals, such as gold or garnet. Recognition of these minerals generally is difficult due to the fine-grained size in placer deposits and lack of interest on the part of previous placer miners due to the non-economic nature of these commodities. Information regarding the extent or distribution of the strategic minerals is minimal, with only a qualitative assessment in a few of the occurrences.

4.3.3.1 Beryllium

Minor beryllium is associated with beryl-bearing pegmatites related to the Kaniksu Batholith in Boundary and Bonner counties. The potential for beryllium is low based on the lack of mineral prospects and no prior production of this commodity within the planning area. Only minimal information is available on the location or distribution of beryllium within the planning area.

The Mineral Potential Classification Rating **(Table 4-4)** for beryllium in the Coeur d'Alene Field Office planning area is **L-B** due to the lack of occurrences.

4.3.3.2 Cobalt and Nickel

A few occurrences of cobalt and nickel are associated with segregations and veins in the gabbroic Purcell Sills in Boundary County and with one small prospect in Shoshone County. Cobalt was recovered as a by-product of the zinc smelter recovery in the Coeur d'Alene Mining District, but it was of minor economic importance. The geological terrain that includes the presence of the mafic Purcell Sills may be considered somewhat favorable, based on the association with other mafic intrusives in the United States that contain magmatic segregations of copper-nickel-cobalt.

The Mineral Potential Classification Rating **(Table 4-4)** for cobalt-nickel within the Coeur d'Alene Field Office planning area is **L-B** due to the limited number of prospects and limited information.

4.3.3.3 Manganese

There are a few minor occurrences of manganese within the planning area, primarily as gangue minerals associated with other mineral types. The only significant prospect is associated with a manganese-cemented breccia in the Murray Mining District in Shoshone County. In general, manganese has to be subjected to deep weathering processes that mobilize and concentrate the material as a secondary deposit in order to produce economic grade material. There is no evidence of primary source rocks or the weathering conditions necessary to produce manganese enrichment within the planning area.

The Mineral Potential Classification Rating **(Table 4-4)** for manganese within the Coeur d'Alene Field Office planning area is **L-B** because of an unfavorable geological environment and a lack of prospects.

4.3.3.4 Niobium and Tantalum

There are no reported occurrences of niobium/tantalum within the planning area. Some granitic intrusions may contain elevated amounts of disseminated columbite/tantalite minerals that are concentrated by weathering to form placer deposits. Elsewhere in central Idaho black-sand deposits containing niobium/tantalum minerals have been recovered as a by-product of monazite placer mining. Information is minimal regarding distribution of niobium/tantalum within the planning area.

The Mineral Potential Classification Rating **(Table 4-4)** for niobium/tantalum within the Coeur d'Alene Field Office planning area is **L-B** due to a lack of occurrences.

4.3.3.5 Thorium and Rare Earths

Several locations of thorium and rare earths are present throughout the planning area. In northern Boundary County thorite occurs in quartz veins, breccias, and replacement deposits in the Belt Series overlying the mafic Purcell Sills. The Tertiary plutons of central Idaho contain elevated levels of

uranium and thorium that are concentrated in black-sand placers. Black-sand deposits containing monazite and thorite are located throughout the alluvial placers in central Idaho that are underlain by the Idaho Batholith. No black-sand placer deposits have been identified in the planning area. The level of information concerning thorite and rare earths either in the intrusive phases or in black-sand placers is limited.

The Mineral Potential Classification Rating **(Table 4-4)** for thorium and rare earths within the Coeur d'Alene Field Office planning area is **L-B** due to the limited number of lode prospects and unidentified black-sand occurrences**.**

4.3.3.6 Titanium, Zirconium, and Hafnium

Only a few occurrences of titanium, zirconium, and associated hafnium are identified in the planning area. These are primarily found as a by-product with silica, feldspar, and clay in the clay deposits of weathered granite in Latah and Shoshone counties. Most of these minerals are found as accessories in granitic rocks that are concentrated as detrital grains in black-sand placer deposits. Information concerning these minerals is limited.

The Potential Mineral Classification Rating **(Table 4-4)** for titanium, zirconium, and hafnium within the Coeur d'Alene Field Office planning area is **L-B** based on the lack of occurrences and limited available information.

4.3.4 Other Minerals

Other minerals includes a wide variety of minerals, some of which are found within the planning area as primary occurrences or deposits. Sometimes they are recovered as by-products in the mining of a primary mineral, such as silver, lead, or zinc. Other mineral types, such as molybdenum or tungsten deposits, exhibit a specific geological environment.

4.3.4.1 Antimony

Antimony was primarily recovered in the Silver Refinery at the Sunshine Mine, and at the Bunker Hill Smelter from lead-zinc-silver ores in the Coeur d'Alene Mining District. These facilities are no longer available. Antimony is found as gold-bearing veins in granitic intrusives and adjacent metamorphic wall rocks. The limited antimony demand is met by smelter supplies elsewhere in the world.

The Potential Mineral Classification Rating **(Table 4-4)** for antimony in the Coeur d'Alene Field Office planning area is **L-B** based on the limited number of prospects and lack of smelter facilities in the district..

4.3.4.2 Barite

There are no reported occurrences of barite within the planning area. Geologically, barite is found within veins in granitic intrusives and as bedded strata-bound deposits in black-shale sedimentary sequences. The primary

supplier of barite in the US is China, with significant resources located in northern Nevada that could be reopened in the future, if required.

The Potential Mineral Classification Rating **(Table 4-4)** for barite in the Coeur d'Alene Field Office planning area is **L-B** due to a lack of occurrences.

4.3.4.3 Fluorspar

Fluorite is sometimes found as a constituent in mineral deposit associated with Tertiary Plutons in central Idaho. No fluorspar prospects or mines exist within the planning area. The primary supplier of fluorspar in the US is Mexico, which has extensive reserves for the future.

The Potential Mineral Classification Rating **(Table 4-4)** for fluorspar in the Coeur d'Alene Field Office planning area is **L-B** due to a lack of prospects in the region.

4.3.4.4 Garnet

No garnet prospects or mines outside of the Emerald Creek deposits in Shoshone and Latah counties are present within the planning area. Garnet is found in the metamorphic aureole surrounding intrusive rocks and is concentrated as detrital grains in placer deposits. The geological environment is favorable for the development of garnet-bearing placers throughout the region where carbonate sequences are intruded by granitic bodies. Drainages from the margins of the Idaho Batholith may be a potential source for garnet concentration. The possibility of new local producers entering the market is very low due to the extensive resources available to the current mine operator, Emerald Creek Mining Company.

The Potential Mineral Classification Rating **(Table 4-4)** for garnet in the Coeur d'Alene Field Office planning area outside of the Emerald Creek Mining District in Shoshone County is **L-B** due to minor occurrences and the lack of information regarding this material in the region.

4.3.4.5 Gems

Gemstones are found at a number of localities within Idaho, primarily in the Emerald Creek area in Shoshone and Latah counties. Geological environments considered favorable for gemstones include high-grade metamorphic terrains and late-stage intrusive phases of the Tertiary plutons. Placer deposits of black-sand may contain concentrations of precious or semi-precious gemstones. None have been reported in the planning area. Recreation miners are the primary source of local gemstone material, with no feasible future for commercial development.

The Potential Mineral Classification Rating **(Table 4-4)** for gems in the Coeur d'Alene Field Office planning area is **L-B** due to a limited number of occurrences.

4.3.4.6 Gypsum and Anhydrite

There are no known occurrences of commercial gypsum or anhydrite within the planning area. Gypsum and anhydrite form primarily from evaporite sequences in unique sedimentary environments and as hydrothermal emanations from igneous sources.

The Potential Mineral Classification Rating **(Table 4-4)** for gypsum/anhydrite in the Coeur d'Alene Field Office planning area is **L-B** due to a lack of occurrences.

4.3.4.7 Mercury

There are no occurrences of mercury within the planning area. The geological environment for mercury is primarily in older shallow hot springs epithermal deposits that may contain gold and silver. There are no identified Tertiary age hot spring areas within the planning area.

The Potential Mineral Classification Rating **(Table 4-4)** for mercury in the Coeur d'Alene Field Office planning area is **L-B** due to a lack of occurrences.

4.3.4.8 Mica, Feldspar and Associated Pegmatite Material

The occurrences of mica, feldspar, silica, and associated pegmatite material are very limited in the planning area. However, in the Avon District just to the south of the planning area boundary in Latah County, there has been significant historical production of these materials. In general mica and feldspar and other minerals have to be mined and recovered in order to produce a commercially feasible operation. Pegmatites are generally associated with late state emanations from the Kaniksu batholith in Boundary and Bonner Counties.

The Potential Mineral Classification Rating **(Table 4-4)** for mica, feldspar, and associated pegmatite material in the Coeur d'Alene Field Office planning area is **L-B** due to the limited number of occurrences.

4.3.4.9 Molybdenum

A number of molybdenum prospects and occurrences are found within the planning area. These include small veins near the margins of the Kaniksu Batholith in Boundary and Bonner counties. The significant deposits of molybdenite of the Climax Type are generally associated with small multi-phase silicic plutons containing associated breccia zones. However, these often are not recognized at the surface due to the depths of emplacement. Exploring and discovering blind molybdenum deposits at depths of a few hundred to a few thousand feet is a possibility within the region. Information on the location of such systems is virtually nonexistent.

Most of the molybdenum in the US is supplied by the Henderson Mine in Colorado, the Thompson Creek Mine in Idaho, and as a by-product of the porphyry copper producers.

The Potential Mineral Classification Rating **(Table 4-4)** for molybdenum in the Coeur d'Alene Field Office planning area is **L-A** based on the lack of significant prospects but with the recognition that favorable geological terrain is present for development of potential deep blind targets of the Climax type..

4.3.4.10 Phosphate

All significant phosphate deposits are located in southeast Idaho within a unique sedimentary unit (Phosphoria Formation) of Permian age. There are no phosphate prospects within the planning area, and the geological environment for the formation of phosphate deposits is nonexistent. Nearly all of the US phosphate is supplied from southeast Idaho and Florida.

The Potential Mineral Classification Rating **(Table 4-4)** for phosphate in the Coeur d'Alene Field Office planning area is **O-D** due to the lack of favorable host rocks or favorable conditions to form these deposits.

4.3.4.11 Refractory Minerals

The principal refractory mineral (Kyanite) resource in the planning area is located in the Goat Mountain area in Shoshone County, where kyanite reported to occur over a broad area. The geologic conditions favorable for development of refractory minerals is in the contact zones between the Idaho Batholith and older argillaceous rocks of the Belt Series. There are no BLM lands located near the Goat Mountain area.

The Potential Mineral Resource Classification **(Table 4-4)** for refractory minerals within the Coeur d'Alene Field Office planning area is **L-B** based on a limited number of occurrences and lack of information regarding the Goat Mountain area.

4.3.4.12 Salt

There are no indications of any salt occurrences or prospects within the planning area. The geological environment for salt is in evaporite sedimentary sequences that are not present within the planning area.

The Potential Mineral Resource Classification **(Table 4-4)** for salt within the Coeur d'Alene Field Office planning area is **O-D** due to no prospects and an unfavorable geological environment.

4.3.4.13 Tungsten

There are a number of tungsten prospects within the planning area. These are reported from quartz veins in mafic Purcell Sills in Boundary County and

as stringer and veins in the Golden Chest Mine, Murray District and in the Pine Creek District, both of which are in Shoshone County. Scheelite-bearing quartz veins in rhyolite dikes are located in the Elk Mountain District, Kootenai County. The geologic environment for tungsten is usually in reactive carbonate sequences intruded by felsic plutons or dikes that create skarn deposits with a wide variety of minerals, including gold, copper, tungsten, lead, and zinc. Principal supplies of tungsten are imported from China, which satisfies most of the market demand.

The Potential Mineral Resource Classification **(Table 4-4)** for tungsten within the Coeur d'Alene Field Office planning area is **L-B** based on the limited number and size of the prospects. The geological environment is generally considered to be favorable.

4.3.4.14 Uranium

Although there are a number of radioactive mineral occurrences in Idaho, the state has not been an important producer of uranium. There are no mines or prospects within the planning area. The only uranium occurrence noted is uraninite that occurs as veins and veinlets within the ore zone of the Coeur d'Alene Mining District. However, these are of a different age and are not considered to be genetically related to the silver-lead-zinc mineralization of the district. Uranium also may occur in black-sand placer deposits associated with monazite, but none has been identified in the region.

The Potential Mineral Resource Classification **(Table 4-4)** for uranium within the Coeur d'Alene Field Office planning area is **L-B** based on a lack of significant prospects and no favorable geological environment.

4.3.4.15 Vanadium

Vanadium has been identified in black-sand deposits in Central Idaho, but there are no reported occurrences within the planning area. Geological conditions favorable for vanadium include the phosphate-bearing Phosphoria Formation in southeast Idaho. There is no similar geological environment in northern Idaho.

The Potential Mineral Resource Classification **(Table 4-4)** for vanadium within the Coeur d'Alene Field Office planning area is **L-B** due to a lack of prospects and unfavorable geological conditions.

4.3.4.16 Copper

Copper is recovered as a co-product in the silver-lead-zinc ores of the Coeur d'Alene Mining District. It is only a minor product, and no production has been recorded in the past decade. Minor copper-bearing polymetallic quartz veins occur throughout the planning area.

The Potential Mineral Resource Classification **(Table 4-4)** for copper within the Coeur d'Alene Field Office planning area is **L-B** based on the lack of producers within the Coeur d'Alene Mining District and minor occurrences elsewhere in the planning area.

4.3.4.17 Iron

There are no significant iron occurrences or prospects within the planning area. A previous study of the potential for iron deposits within Idaho was completed by the US Bureau of Mines; that study concluded that there was no potential for large resources of iron in Idaho.

The Potential Mineral Resource Classification **(Table 4-4)** for iron within the Coeur d'Alene Field Office is **L-B** based on the lack of mines or prospects and the prior study of the iron resources.

4.4 SALABLE MINERAL POTENTIAL

There are several salable materials mine sites within the planning area, primarily sand, gravel, and aggregate pits developed in response to the construction industry. Limestone is another commodity that is in demand for crushed aggregate and for the cement industry. The commodity potential of the salable material in the Coeur d'Alene Field Office planning area is presented in **Table 4-4**.

4.4.1 Sand, Gravel, and Quarry Rock (aggregate)

The sand, gravel, and crushed aggregate industry is developing substantial resources on private and state lands within the planning area to meet the expanded demand for construction and industrial materials. In 2002 sand, gravel, and crushed aggregate production was the largest mineral industry in Idaho, with over 15,700,000 metric tons produced at a value of $56 million. There are substantial resources of sand and gravel throughout the Purcell Trench in Boundary and Bonner counties and in the Rathdrum Prairie in Kootenai County. The sand and gravel industry has grown substantially since 1988 due to the rapid growth in the urban areas of Coeur d'Alene, Spokane, and Pend Oreille. Development on many potential material sites is restricted, due to government restriction and zoning laws that often inhibit local development of the resource. This results in evaluating deposits that are farther from the consumption site and puts pressure on large landholders, such as the BLM, to provide material for new mines.

There is very limited BLM land present within the potential sites in the Rathdrum Prairie or the Purcell Trench. One BLM lease is present under railroad lands near Post Falls, where the minerals are retained by the federal government. Elsewhere development is on private or state lands, but this could change in the future as demand increases for material at locations near developments.

The Mineral Potential Classification Rating (**Table 4-4)** for sand, gravel, and crushed aggregate in the Coeur d'Alene Field Office planning area is **H-D** based on the high level of production and increasing demand for this material by the construction industry.

4.4.2 Pumice and Pumicite

Nearly all of the pumice and pumicite is in southern Idaho, where there were extensive rhyolitic eruptions of Tertiary age across the Snake River Plain that produced these materials. There are no comparable silicic volcanic eruptions within the planning area and no known occurrences of pumice or pumicite.

The Mineral Potential Classification Rating **(Table 4-4)** for pumice and pumicite within the Coeur d'Alene Field Office planning area is **L-B** based on a lack of occurrences.

4.4.3 Silica/Quartzite

A number of inactive silica deposits are located throughout the planning area, developed primarily as quartzite producers from the Precambrian Belt Series. These include the Little Grass Mountain (O'Brien) and the Gold Creek Silica (Green Mountain) prospects in Bonner County. No published data are available on these deposits. Geological conditions are favorable for discovery of quartzite deposits based on the large areas of Revett and St. Regis quartzites of the Belt Series within the eastern Idaho panhandle region. Quantity or quality of the quartzite material within the relatively pure quartzite units of the Belt Series is unknown.

Other occurrences of silica have been noted just south of the planning area boundary at the Bovill and Joel Silica deposits in Latah County, where quartz was recovered as a by-product of the clay operations in that area. These deposits are developed as residual weathering products from the Thatuna granodiorite that continues into southwest Shoshone County. No information is available regarding this area in Shoshone County.

The Mineral Potential Classification Rating **(Table 4-4)** for silica/quartzite within the Coeur d'Alene Field Office planning area is **L-B** based primarily on the lack of mines and prospects, although there are large areas of Belt Series quartzite present throughout the planning area.

4.4.4 Limestone

The only historic development of limestone within the planning area is at the southern end of Pend Oreille Lake at the Bayview and Lakeview District in Bonner County. These deposits were quarried for lime and cement material but were of poor quality and did not meet industry specifications at the time. These deposits are developed in an isolated block of lower Paleozoic rocks that only occurs in this specific area. Other carbonate-bearing units occur in

the Wallace at the top of the Belt Series, but these appear not to be pure enough for commercial grade standards.

The Mineral Potential Classification Rating **(Table 4-4**) for limestone within the Coeur d'Alene Field Office planning area is **L-B** based on a limited number of prospects and the lack of high quality lime material.

4.4.5 Clay

The only two small clay prospects within the planning area are in western Kootenai County. The Stockton and the Stanley Hill clay deposits are of limited extent. They developed as weathered horizons within the Columbia River Basalts and the Latah formation. No information is available on the quantity or quality of the material shipped from these deposits. The most significant clay production in the region came from the Bovill and other deposits located just south of the planning area boundary in northern Latah County. They are formed by weathering of the Thatuna granodiorite and Columbia River Basalts that extend into southwest Shoshone County. Information is not available on the extent of clay deposits in Shoshone County.

The Mineral Potential Classification Rating **(Table 4-4)** for clay within the Coeur d'Alene Field Office planning area is **L-A** due to the presence of a few mineral prospects with unknown quantitative information.

4.4.6 Dimension Stone

There are a number of potential dimension stone localities throughout the planning area, with a few BLM material sales sites in Shoshone County. The geological terrain is favorable for the presence of dimension stone within the Belt Series quartzites and Columbia River Basalts. High demand for dimension stone by the construction and landscaping industry has developed as growth in the larger urban centers expands.

The Mineral Potential Classification Rating **(Table 4-4)** for dimension stone in the Coeur d'Alene Field Office planning area is **H-C** based on the high level of demand and the number of active quarries in the region.

4.5 CONCLUSIONS

The Coeur d'Alene Field Office planning area contains significant resource potential for a wide variety of nonfuel minerals and material commodities **(Figure 4-2)**. The region has had continuous mineral development for over 140 years, including the premier silver-lead-zinc Coeur d'Alene Mining District, significant gold production from the Murray Mining District, and abrasive garnets from the Emerald Creek Mining District. Recent development of various industrial minerals, including sand/gravel/aggregate, dimension stone, garnet, limestone, and clay, has expanded in response to urban growth and construction.

The mineral commodities within the Coeur d'Alene Field Office planning area are classified for the potential of locatable, salable, leasable (fluids and solids) and acquired lands leases, according to the criteria outlined in BLM Manual #3031. This mineral resource classification is based on a critical assessment of a number of factors, including the presence or absence of a significant number of mines or prospects; the development or expansion of existing operations; success or failure of exploration projects; favorable geological terrain; and the level of available information regarding the commodities present.

High mineral potential classification was assigned to the following commodities:

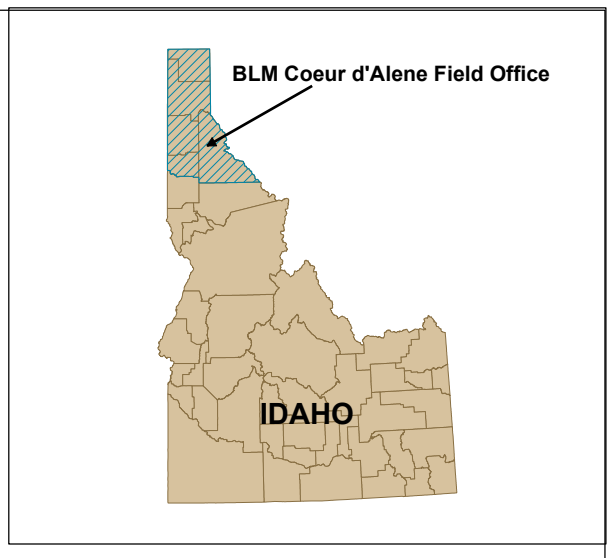
- Silver-lead-zinc in the Coeur d'Alene Mining District;
- Gold in the Murray Mining District;
- Garnet (abrasive and recreational) in the Emerald Creek District;
- Sand/gravel/aggregate in the Coeur d'Alene and Pend Oreille areas; and
- Dimension stone throughout the planning area.

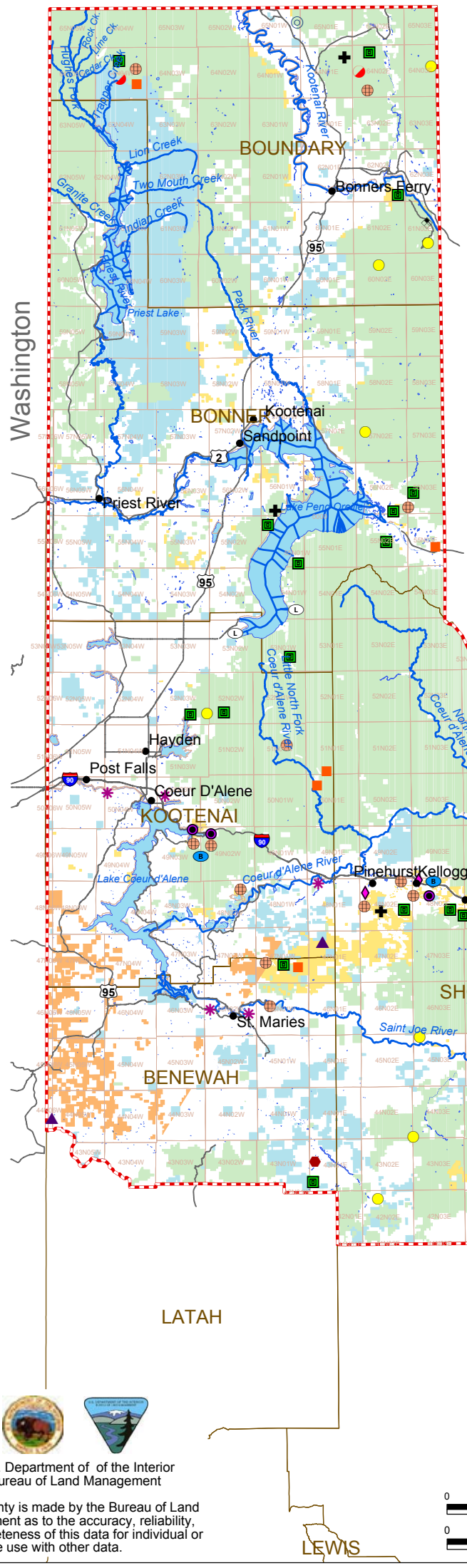
Strategic minerals were evaluated and appear to have a low potential, but information is limited regarding distribution or occurrence for important minerals, such as cobalt-nickel, thorium-rare earths, and niobium-tantalum, that are present in the region.

All other minerals have a low potential based on a lack of significant prospects or occurrences and other indirect evidence from a limited amount of information.

There is low potential for energy resources, including oil/gas, coal, or geothermal varieties, based on the quantity and quality of the few prospects or occurrences and the generally unfavorable geological conditions for the formation of these resources.

Federal restriction on land entry and use seriously inhibits the timely exploration, evaluation, and development of mineral resources critical to the economy and to maintaining the current standard of living within the United States. It is important to maintain a balance between the competing demands for mineral resource development, recreational opportunities, and environmental protection.





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Bureau of Land Management

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of this data for individual or aggregate use with other data.

Decmber 2004

Source: Base Layers - BLM 2004b.
Mineral Resources - Ross and Forester 1958.

Mineral Types

- Antimony
- Arsenic
- Bismuth
- Clay
- Copper
- Garnet
- Gold
- Iron Ore
- Kyanite
- Lead and Silver
- Lead and Zinc
- Limestone
- Molybdenum
- Thorium
- Tungsten
- Uranium

Mineral Resources

Coeur d'Alene Field Office, Idaho

Figure 4-2

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5. RECOMMENDATIONS

SECTION 5
RECOMMENDATIONS

The following recommendations are made regarding the assessment and evaluation of the mineral resources potential both on and near the BLM land within the Coeur d'Alene Field Office planning area. Understanding the short- and long-term consequences of decisions about managing mineral resources is important in future land management goals. It is important to maintain a balance between mineral resource development necessary for the modern technology-based economic system and preservation and protection of the unique ecological systems that support the life and health of the populace.

Mineral deposits are unique concentrations of mineral commodities that only reach commercial potential in a very few localities. Similar conclusions can be reached for the ecological systems that are equally important in providing a livable and healthful environment. Both of the systems are mutually dependent in order to maintain the current standard of living and economic growth of the United States.

The following recommendations are presented:

- Prospective valuable mineral classifications should be reviewed annually and updated as necessary.

  Over time, additional data from federal, state, and industry sources will provide more comprehensive information to assess the mineral resource potential.

- Identify and evaluate areas or commodities that require additional assessment.

  Limited information is available on the thorite prospects at Hall Mountain prospect; this prospect requires a better definition of the general size and distribution of this strategic

mineral. The potential for strategic minerals cobalt-nickel in magmatic segregations in the Purcell Sills is unknown, particularly in the Crossport Sill area on or near BLM land in Bonner County.

- A higher level of mineral assessment should be completed within current areas considered for withdrawal status.

  This would include evaluating placers containing gold and black-sand deposits, which may have strategic minerals niobium/tantalum or thorium/rare earths. In addition, sand and gravel potential within critical river systems should be examined.

6. REFERENCES

SECTION 6
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7. GLOSSARY

SECTION 7
GLOSSARY

ACQUIRED LANDS. Acquired lands, as distinguished from public lands, are those lands in federal ownership which have been obtained by the government by purchase, condemnation, or gift, or by exchange for such purchased, condemned, or donated lands, or for timber on such lands.

ALLUVIAL SOIL. A soil developing from recently deposited alluvium and exhibiting essentially no horizon development or modification of the recently deposited materials.

ALLUVIUM. Clay, silt, sand, gravel, or other rock materials transported by moving water. Deposited in comparatively recent geologic time as sorted or semi-sorted sediment in rivers, floodplains, lakes, and shores, and in fans at the base of mountain slopes.

ENVIRONMENTAL IMPACT STATEMENT (EIS). A formal public document prepared to analyze the impacts on the environment of a proposed project or action and released for comment and review. An EIS must meet the requirements of NEPA, CEQ guidelines, and directives of the agency responsible for the proposed project or action.

IMPACT. The effect, influence, alteration, or imprint caused by an action.

LEASABLE MINERALS. Those minerals or materials designated as lease able under the Mineral Leasing Act of 1920. They include coal, phosphate, asphalt, sulphur, potassium and sodium minerals, and oil and gas. Geothermal resources are also lease able under the Geothermal Steam Act of 1970.

LOCATABLE MINERALS. Minerals or materials subject to claim and development under the Mining Law of 1872, as amended. Generally includes

metallic minerals, such as gold and silver, and other materials not subject to lease or sale (some bentonites, limestone, talc, some xeolites, etc.). Whether or not a particular mineral deposit is locatable depends on such factors as quality, quantity, the ability to be mined, demand, and marketability.

MINERAL ENTRY. Claiming public lands (administered by the BLM) under the Mining Law of 1872 for the purpose of exploiting minerals. May also refer to mineral exploration and development under the mineral leasing laws and the Material Sale Act of 1947.

MINERAL MATERIALS. Common varieties of sand, building stone, gravel, clay, moss, and rock obtainable under the Minerals Act of 1947, as amended.

MINING LAW OF 1872. Provides for claiming and gaining title to locatable minerals on public lands. Also referred to as the "General Mining Laws" or "Mining Laws."

PALEONTOLOGICAL RESOURCES. The physical remains or other physical evidence of plants and animals preserved in soils and sedimentary rock formations. Paleontological resources are important for correlating and dating rock strata and for understanding past environments, environmental change, and the evolution of life.

PATENT. A grant made to an individual or group conveying fee simple title to selected public lands.

PATENTED CLAIM. A claim on which title has passed from the federal government to the mining claimant under the Mining Law of 1872.

PLANNING AREA. The geographical area for which land use and resource management plans are developed and maintained. In this case, the planning area is the Coeur d'Alene Field Office boundary.

PUBLIC LAND. Any land and interest in land (outside of Alaska) owned by the United States and administered by the Secretary of the Interior through the BLM.

RESOURCE MANAGEMENT PLAN (RMP). A land use plan that establishes land use allocations, multiple-use guidelines, and management objectives for a given planning area. The RMP planning system has been used by the BLM since about 1980.

SALABLE MINERALS. Those minerals or materials designated as salable under the General Mining Law of 1872, as amended. They include common varieties of sand, stone, gravel, pumice, cinder, clay, and petrified wood.

SPLIT ESTATE. Split estate lands occur when the federal government owns and manages the mineral estate and another party owns the surface lands.

WEATHERING. Deep weathering refers to the physical disintegration and chemical decomposition of the rock that produces an in situ mantle of material, mainly clay, in composition that is several tens of feet deep, rather than a thin normal surface soil weathering a few inches deep.